

SUPPORT FOR THE AMENDMENT

Claims 25, 27, 29, 31, 33 and 35 have been written in independent form. No new matter would be added to this application by entry of this amendment.

Upon entry of this amendment, claims 25-36 will now be active in this application.

### REQUEST FOR RECONSIDERATION

The claimed invention is directed to a method of dehydrogenation of cyclic or acyclic carbonyl compound to the corresponding  $\alpha,\beta$ -unsaturated carbonyl compounds.

Oxidized oxo-functionalized hydrocarbons would have utility as reaction intermediates. Techniques for such oxidation can be difficult in so far as oxidation of the oxo-functionality is not desired. Accordingly, oxidation techniques for cyclic or acyclic carbonyl compounds to the corresponding  $\alpha,\beta$ -unsaturated carbonyl compounds are sought.

The claimed invention addresses this problem by providing a method of dehydrogenation of cyclic or acyclic carbonyl compounds to the corresponding  $\alpha,\beta$ -unsaturated carbonyl compounds by contacting with a supported catalytically active composition comprising Pd and Bi. Applicants have discovered that such a Pd and Bi containing catalyst to provide for effective dehydrogenation of cyclic or acyclic carbonyl compound to produce the corresponding  $\alpha,\beta$ -unsaturated carbonyl compounds. Such a method is nowhere disclosed or suggested in the cited references of record.

The rejections of claims 19-36 under 35 U.S.C. 103(a) over Brown et al. U.S. 6,127,310, Aoshima et al. U.S. 4,518,796 and Wilhelm U.S. 3,940,329 each in view of GB 1,340 612 is respectfully traversed.

None of the cited reference disclose or suggest dehydrogenation of cyclic or acyclic carbonyl compound to produce the corresponding  $\alpha,\beta$ -unsaturated carbonyl compounds using a supported catalyst comprising Pd and Bi.

None of the primary references disclose or suggest a dehydrogenation reaction using a catalyst as claimed (page 3 of official action).

Brown et al. describe a **hydrogenation reaction** of highly unsaturated hydrocarbons to less unsaturated hydrocarbons. A dehydrogenation reaction to produce  $\alpha,\beta$ -unsaturated carbonyl compounds using a catalyst as claimed is not suggested.

Aoshima et al. describes an **esterification reaction** by reaction of an aldehyde with an alcohol to produce a carboxylic ester. A dehydrogenation reaction to produce  $\alpha,\beta$ -unsaturated carbonyl compounds using a catalyst as claimed is not suggested.

Wilhelm describes a catalytic **reforming** process of a low-octane gasoline fraction in the presence of hydrogen. A dehydrogenation reaction to produce  $\alpha,\beta$ -unsaturated carbonyl compounds using a catalyst as claimed is not suggested.

Accordingly, none of the primary references can suggest a dehydrogenation reaction to produce  $\alpha,\beta$ -unsaturated carbonyl compounds using a catalyst as claimed as the references are directed to fundamentally different reactions.

GB 1,340,612 has been cited as disclosing a dehydrogenation reaction of ketones to the corresponding  $\alpha,\beta$ -unsaturated carbonyl compound by reaction with a compound of the platinum group metal in a bivalent or higher valency state, at a temperature of from -15 to 180°C (page 1, lines 1-5). Suitable metals are described as Ru, Rh, Pd, Os, Ir and Pt. The reaction is preferably conducted in the presence of peroxy compounds, in order to avoid using stoichiometric amounts of the platinum metal (page 1, lines 45-55). The reaction is conducted using **a solution** of the platinum metal compound as evidenced by the examples in which the  $\text{PdCl}_2$  is dissolved in HCl or a solution of  $\text{RhCl}_3$  or hexachloroplatinic (IV) acid in cyclohexanone is used. The reference fails to disclose or suggest Bi as a catalyst component or a supported catalyst in the dehydrogenation as a solution of platinum metal is used.

In contrast, the claimed invention is directed to a dehydrogenation reaction of cyclic or acyclic carbonyl compounds into the corresponding  $\alpha,\beta$ -unsaturated compounds by contacting with a supported Pd and Bi containing catalyst. Applicants note that the claims

are only directed to a dehydrogenation method and the catalyst *per se* is no longer being claimed. As the cited references fail to disclose or suggest a dehydrogenation reaction using a supported Pd and Bi containing catalyst as claimed, the claimed invention is not rendered obvious by the cited references.

Page 3 of the outstanding official action suggests that one of skill in the art would have been motivated to use the catalysts of either Brown et al., Aoshima et al or Wilhelm in the process of GB '612 based on the common use of Pd in the reactions. Applicants respectfully note that one of ordinary skill in the art would not be motivated to use any of a demonstrated hydrogenation catalyst, esterification catalyst or reformation catalyst in a dehydrogenation reaction as none of the reactions of hydrogenation, esterification or reformation would suggest a catalytic activity in a dehydrogenation reaction. The mere use of Pd in a dehydrogenation reaction would fail to suggest the use of the catalysts of the primary references in a dehydrogenation reaction.

As the cited combination of references fails to disclose or suggest a dehydrogenation reaction using a catalyst comprising Pd and Bi, the claimed invention is not rendered obvious and accordingly, withdrawal of the rejection under 35 U.S.C. 103(a) is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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